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EDITORIAL NOTES

THE PLANNING COMMITTTEE AT WORK

IN a recent issue we published an article by a Gas Engineer in the Provinces under the title "The Veil of Secrecy." For the title we accept full responsibility, because the author quoted it from one of our own Editorial Notes of a few weeks before. If the sentiments expressed both in the article and the Editorial were not particularly complimentary to the central bodies of the Gas Industry—especially in their new guise of Post-War Planning Committee—we accept no responsibility, since we firmly believe they were, and are, representative of what a very large part of the Industry is thinking. Through the courtesy of the Chairman, the Deputy Chairman, and the Convenor of the Committee, we have now been given an insight into its workings, or at least into the methods by which it intends to work, since for reasons partly of expediency and partly technical, it does not consider itself at present in a position to "broadcast" to any great extent. The question of expediency is linked largely with the fact that the Committee is still what might be called competition conscious. One must needs agree with this attitude if other hitherto competing fuels are busy planning a highly cut-throat future on the old lines, but if possible intensified; in such case it would doubtless be folly to disclose to the world the very means by which we propose to fit ourselves for the fray. On the other hand, there are many who, with good reason we think, visualize a far different future for the fuel industries of the country in which, if the various industries cannot live amicably together of their volition, means will be found to make them do so in whatever way will best serve the people.

The technical reasons for the measure of silence which the Committee is obliged to maintain at present are, strangely enough, beyond its control. It was originally set up by the National Gas Council and subsequently adopted by the British Gas Federation. Its terms of reference are: "To collect and collate relevant information and consider the same and make recommendations concerning the steps to be taken by the Industry to place it upon such a basis that it can best meet the altered conditions of the future and make the largest possible contribution to national and social welfare, and to report to the constituent bodies." The sting is in the tail. The Industry in general must not expect progress reports from the Committee; *its job is to report to the constituent bodies of the Federation.* When the time comes, therefore, 10 members out of the 14 who compose the P.W.P. Committee will report to themselves; they are members also of the B.G.F. Council. In fact, "new blood" on the P.W.P. Committee, as can be seen by a comparison of the published lists, is represented by four members.

We know every single member of the Committee well enough to be certain that they will read into this no disrespect. We have, indeed, the greatest regard for the stalwarts who for years have borne the brunt of all the Industry's mass of committee work, and they would not have achieved their positions either in their own undertakings or on representative committees except by merit. It is the committee system itself which is at fault. It has grown so rampantly as to have become almost beyond disentangling, and it is really not surprising that, when for various reasons the crisis has come upon us, the system has been able to throw up to meet it what amounts to little more than a sub-committee of an existing committee, which quite frankly has disappointed the Industry, to say the least.

Let us be quite fair, then, and blame the system, pointing out that nominally at least it has been based upon the free election of delegates to represent all interests and all areas of the country. How, if there is, or has been, any discontent on the part of any special interest or area has it been able to continue unvoiced or unremedied? And why was the grand conception of the British Gas Federation never carried to its logical conclusion of cleaning up the interminable confusion of interlocking councils and committees, both on the districts and at headquarters, till a man scarcely knew at any given moment whether he was N.G.C., I.G.E., B.C.G.A., or S.B.G.I.?

At the moment, and for ever after, the ruling consideration must be that we are all Gas Industry, and we have set out the considerations above with a view to assessing some of the difficulties with which the Industry is faced in planning for a new future. It is most satisfactory to know that one of the matters to which the Committee is giving consideration is the relative functions of the various national gas bodies at headquarters and on the districts. As we have implied, this question to our mind is fundamental. Even if, for technical reasons, the subject has to be named *Post-War* Planning, do let us get out of our heads any idea that the need for a plan is any direct result of Germany's onslaught. The need has been growing more acute year by year ever since the Gas Industry talked in precisely the same terms during the 1914–18 war years and after. Returning to the present problems, we are pleased to have the assurance of the P.W.P. Committee that steps are definitely being taken to consult the districts, and we cannot urge too strongly upon the districts that this is their grand, and perhaps final, chance to help in shaping their own destinies. Let them think hard, and think quickly. Have they, in the first place, the machinery for thinking with one mind and speaking with one voice, or is their representation at present in the hands of overlapping, interlocking, and entirely unco-ordinated committees? Have they any particular problems which affect them geographically? Have they the means of taking, assessing, and passing on the views of the younger generation, and also of the "freethinkers," if any there be? These are some of the questions which the districts must ask themselves and find means of answering if they are to give the Committee the help which it quite frankly needs.

Then, too, the Committee has made clear to us that it heartily welcomes individual contributions to the solution of the common problems, and such essays as those of Messrs. L. P. Ingram, E. O. Rose, and H. N. Dann, which have been published in the "JOURNAL" in recent months, have all received the close study which they merit.

As we have said, we are not in a position to detail the work done to date by the Committee. One of its major difficulties obviously is the fact that most of its members are fully enough occupied with day-to-day problems on their own works. But we are assured that much essential preliminary spadework has been accomplished, and the titles of the sub-committees, published in another column, may give some indication of the lines along which work is proceeding. It is interesting to note that sub-committees are free to co-opt members, and, even if this has a tendency towards overloading, it is to be welcomed as an opportunity of introducing the "new blood" for which so many are clamouring. The Committee will be wise to give full consideration to this aspect. Close contact, we learn, is being maintained with the Directorate of Gas Supply and with the

Ministry of Works and Planning, and full use will be made of the results achieved by the four I.G.E. Sub-committees of Enquiry on specialized technical subjects.

To sum up, it has been impressed upon us that suggestions in certain quarters that the Committee is oblivious of the trend of events or impervious to ideas and suggestions from without is far from the truth. The redundancy of individual units in the Industry; the fact that the individual consumer must be enabled somehow within his income limits to use more gas if we are to continue as a national utility service; the methods of production, distribution, and utilization which will make this possible. These and other problems obviously loom as large before the P.W.P. Committee as they do before most thinking men in the Industry. It is the machinery proposed for solving them which, by its lack of originality, has shocked the Industry in general. Quite naturally the competence to solve them of an organization which in the far easier pre-war days entirely failed to grasp the nettle is widely questioned, and does not inspire the confidence so sorely needed for unity. It is now or never for those who feel that way to weigh in with their views. The P.W.P. Committee, realizing to the full the handicap of the past and the difficulties of the future, are most certainly in the mood to be receptive of constructive criticism.

THE STANDING OF GAS

IN other fields the war has witnessed no great diminution in the setting-up of committees of one kind or another; the reverse is true. Since the war we have written a great deal about planning, co-ordination, and co-operation—so much, in fact, that the expressions may have become rather tedious to our readers. We must, however, endeavour to mirror events; the setting-up of committees continues, and not alone within the all-too-narrow confines of the Gas Industry. Their establishment is a profession of faith which we sincerely hope will be justified. Now it is obviously of importance that the Industry should be thoroughly conversant with all the moves and plans which are being made and laid by Government Departments in preparation of good housing—future homes which may take the form of either flats or houses—and of building generally, including schools and business premises, for the post-war period. We have said many times before, but we do not hesitate to repeat, that the Industry ought to play a very great part in the provision of heat comfort in future dwellings. We think it owes a duty to the community as well as to itself to make absolutely sure that its capabilities are understood clearly and appreciated by the responsible authorities and bodies. Regarding this we welcomed the opportunity last week of learning at first hand, in a free and frank interview with the Director-General of Post-War Building, the aims, objects, and plans of the Ministry of Works—the great building department of the State which is responsible for a labour force of over 110,000 men supervised by a professional and technical staff of nearly 4,000, in addition to some 250 outside firms. We may say at once that the over-riding aim is that, by the pooling of knowledge at the present juncture, regardless of narrow individual interests, building in this country after the war shall give better value for money than has so far been offered.

For the purpose a committee organization has been arranged on a fairly extensive scale, and we think we should try to sketch in barest outline at any rate one part of the scheme which has been adopted by the Directorate of Post-War Building. The object of the scheme as a whole, it was explained to us, is to unify the scattered activities of existing groups concerned with any and every branch of building activity, necessarily including the fuel and power interests and the makers of appliances, to simplify, to regulate, and where needed to direct. The Directorate, it should be made clear, is approaching the task not through research or experiment of its own, but by collating existing information. A major item is information on the most efficient methods of heating, ventilating, and lighting. For this purpose an "Installations Policy Committee" has been set up, to which "study committees" report. Where suitable committees of professional or trade organizations exist, they are formed into study committees. Where necessary study new committees may be created either by Government Departments or by professional bodies and research associations. It was explained to us that, concerning heating, ventilation, and illumination, three study committees had already been convened: Heating and Ventilating by the Building Research Station, Illumination by the Department of Scientific and Industrial Research, and Electrical Installations by the Institution of Electrical Engineers. We were able to study a chart depicting the scheme as it exists at present, with its network of interlinked committees. There was no mention whatever of any Gas Industry committee.

Whatever may be said or felt about this wave of determination to appoint committees to discuss post-war problems, the influence of the Directorate of Post-War Building is likely to be considerable, and, as we have emphasized, the idea is not so much to appoint new committees as to use existing committees to the best advantage by seeking, sifting, and clarifying information and appraising opinions which may be expressed. So we ask bluntly, How does the Gas Industry intend to fit in with this Ministry of Works post-war building plan? In what way are the Industry's own particular plans and views going to be voiced? What is the Industry's status in this matter? We ask, and in no petty spirit, why, when there is an electrical installations committee, any similar Gas Industry committee appears to be missing from the scheme? We believe that the community will suffer if gas and coke do not occupy a very large place in the provision of heat in post-war building schemes. We hope the Industry is on its toes.

Personal

A tribute to Mr. HORACE LONG, whose retirement from his position as Secretary and Accountant to the East Surrey Gas Company was announced in the "JOURNAL" on Feb. 25, was paid at the Annual General Meeting of the Company on Feb. 24. In the absence of the Chairman, Mr. W. Lees Stenning, the Deputy Chairman, Mr. W. H. Bennett, presented Mr. Long with an inscribed silver salver as a memento of his fifty-two years' service with the Company and also as a token of the regard in which he is held. Responding, Mr. Long expressed his gratification at having been associated with the Undertaking for more than five-eighths of its history.

At a large and representative gathering of employees of the Company on February 26, Mr. J. R. W. Alexander, General Manager, presented to Mr. Long on their behalf a barometer, a pair of fish servers, a hot-water jug, a cruet, and a volume containing the names of the subscribers, numbering no less than 218, to the presentation.

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The marriage took place on Feb. 21 at All Souls' Church, Netherton, Maryport, of Mr. J. GEORGE POPE, Gas Engineer and Manager to Workington Corporation, and Miss Margaret Hogarth, of Netherton, Maryport. Mr. Pope was the recipient of a clock from the staff and employees of the Workington Gas Department.

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Mr. G. T. DUNCAN, Manager of the Doune Gas Department, has been appointed Manager of the Aberlady & Gullane Gas Company, Ltd.

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Mr. R. HENDERSON, Assistant Manager to the Cowdenbeath Gas Company, Ltd., has been appointed Manager of the Penicuik & District Gas Company, Ltd.

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Mr. S. DOYLE, Assistant Secretary to the Cork Consumers Gas Company, has been appointed Secretary in succession to the late Mr. R. Healy.

Obituary

At the recent General Meeting of the Cork Consumers Gas Company the Chairman, Mr. E. T. Mahony, paid a tribute to the late Secretary, Mr. R. HEALY, who had died suddenly. Mr. Healy had been associated with the Company for 50 years, and in each successive position which he held he had displayed that keenness which built up a splendid record of service, of which, said the Chairman, they were all aware.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Post-War Planning Committee

Formation of Sub-Committees

The Post-War Planning Committee of the British Gas Federation announces that its membership has been formed into the following Sub-Committees for the purpose of investigating the various aspects of its work. These Sub-Committees have powers to co-opt members from without, and it will be seen that a start has been made by "Utilization."

(1) MANUFACTURE AND DISTRIBUTION.
Mr. G. Dixon (Chairman).
Mr. C. S. Shapley.
Mr. E. West.
Mr. S. E. Whitehead.
Dr. W. T. K. Braunholtz (Secretary).

(2) UTILIZATION.
Mr. E. V. Evans (Chairman).
Dr. H. Hartley.
Mr. R. J. Rogers.
Dr. W. T. K. Braunholtz (Secretary).

Co-opted Members:
Mr. C. A. Masterman, Mr. J. E. Davis } London.

(3) METHODS OF CHARGE AND STATISTICS.
Mr. A. E. Sylvester (Chairman).
Mr. E. Crowther.
Mr. W. J. Sandeman.
Mr. W. J. Smith (Secretary).

(4) CO-ORDINATION OF GAS UNDERTAKINGS.
Sir David Milne-Watson (Chairman).
Mr. A. W. Smith.
Mr. C. S. Shapley.
Mr. A. E. Sylvester.
Mr. E. Crowther.
Mr. W. J. Sandeman.
Mr. S. E. Whitehead.
Mr. G. Dixon.
Mr. E. V. Evans.
Mr. J. Jamieson.
Mr. F. G. Brewer.

The Fourth General Meeting of the Midland Counties Coke Association will take place at King Edward House, 135, New Street, Birmingham, 2, on March 26, at 2.30 p.m.

The Annual Business Meeting of the London & Southern District Junior Gas Association will be held on Friday, March 27, at 7 p.m., at the Westminster Technical Institute, Vincent Square, S.W. 1. The first meeting of the new Session will be held on Friday, April 24, when Mr. G. Dougill will give his Presidential Address.

A **New Edition** of the *Recommended Values of Illumination*, issued by the Illuminating Engineering Society (the I.E.S. Code), containing certain modifications and additions, including values of illumination for the various textile processes, has now been issued. Copies (8d. each, 9d. post free) are obtainable on application to the Illuminating Engineering Society, 32, Victoria Street, London, S.W. 1.

The War Savings Group run by the Head Office Staff of the East Surrey Gas Company has invested a total of £1,328 since its formation, an average of £16 per week. During the Borough of Reigate Warship Week the Group set itself the formidable task of investing £200. In fact it secured £842, which demonstrates what a staff group can achieve if the necessary effort is exerted. The Reigate Warship Week target of £350,000 was more than doubled. Active in its organization was Mr. J. R. W. Alexander (General Manager of the East Surrey Gas Company), Chairman of the Publicity Committee.

A **Gloom** was cast over the Annual Meeting of the Kettering Gas Company, Ltd., by the references to the death during the year of three of the Directors. They were the former Chairman, Mr. E. P. Toller, Mr. J. C. Wilson, and Mr. A. J. Slade. It was decided to reduce the number of Directors from six to five and Mr. Peter Wilson was elected to succeed the late Mr. Slade on the Board. The Chairman (Mr. T. N. Bird) referred to the accounts as highly satisfactory. They were able to pay the same dividend and at the same time to consolidate their strength.

The Recent Appeal by the Ministry of Mines for economy in the use of all fuels, including gas, was alluded to by Mr. Henry Woodall, when presiding at the annual meeting of the Ipswich Gas Light Company. He said his own view was that, as far as possible, people should try to occupy only one living-room, thereby saving fires. It was essential to keep warm, and uneconomic to get cold and ill. As to the business of the Company, in spite of many troubles the Directors again had the pleasure of being in a position to report a satisfactory year's working. A dividend of 5½% for the year is being paid on the consolidated stock. In the course of the proceedings it was pointed out that this year marks the "coming of age of the Chairman," twenty-one years having elapsed since Mr. Woodall first presided over the annual meetings of the Company.

A Message from the A.G.A.

The following is the text of a reply from Mr. George S. Hawley, President of the American Gas Association, dated Jan. 29, 1942, to a letter dated Dec. 22, 1941 (published in the "Journal" of Jan. 7), addressed to him by Sir Francis Joseph, President of the Society of British Gas Industries.

"I have just received, through the kindness of our former President, Mr. Beckjord, your courageous and inspiring letter of Dec. 22 last.

"It was my privilege to read your letter to two separate groups of members of our Association, and yesterday to our Board of Directors. It made a profound impression upon them all. The Directors wished me to express to you and your associates, and through you to the great people of Great Britain, their deep appreciation and admiration, in which I most sincerely join.

"It is not often that current knowledge and history agree, but here is the exception: We all know full well, and history in the dim distant future will record the fact, that you at a time of unprecedented peril held back the hordes of evil in their march of murder almost to the shores of Britain. But for you, Christian civilization would have been dashed into the abyss of hopeless oblivion.

"We rejoice that you are continuing the fight with renewed strength and success. America now joins you in a combat which will be fought until the possibility of another world conflict will be no more, and lasting peace shall finally be dictated by the true conquerors.

"Things do not move here as fast as we would like, for another cardinal fault of democracies is that they never prepare fully for emergencies which are not both real and imminent. That time has passed. America is now moving forward with giant strides. Soon the skies will rain down upon the assassins just punishment for their heinous crimes, and the victory of Right over Might will be final and complete.

"We join with you in unwavering faith and determination that we will conquer."

A New Type Multi-Fuel Engine*

IN the past the convertible form of engine designed to use either oil or gas as a fuel has been of a type which can be operated as a "straight" oil engine, or as a spark-ignition gas engine. More recently the instantly convertible type which can use varying proportions of oil and gas, changeable while running, has been evolved.

A development from both these principles has taken place, and is seen in practical form at the gas-works of an important borough in the Wirral Peninsula. This engine is operable in three forms: (*a*) As a straightforward oil engine using only liquid fuel; (*b*) as a gas engine, with compression ignition of a small oil charge to initiate combustion; (*c*) as a conventional spark-ignition gas engine.

Owing to this ability to work under a wide variety of conditions, the engine and its two generators are greatly appreciated in the important works in which they are situated. The duty of the engine is to drive A.C. and D.C. machines, furnishing electricity for all the power requirements in the gas-works. At the moment [July, 1941], as adequate gas supplies are available, the engine is run as a spark-ignition unit. At other times it may be desirable to economize in gas, so that the engine is prepared and run on less gas, coupled with the oil-ignition charge. At one time, owing to hostile action, the gas was cut off and the engine ran solely on Pool Diesel oil. The Borough Gas and Water Engineer expresses himself as fully satisfied with this type of power unit as an efficient and attractive emergency measure, and it is also proving economical.

The engine was installed during the year 1940. It is a Crossley totally enclosed three-cylinder, four-stroke unit, of 10½-in. bore and 12-in. stroke, of the type normally rated at 150 b.h.p. at 500 r.p.m. as an oil engine. On site, it is rated at 130 b.h.p. at the same speed as an oil engine or as an oil-cum-gas unit, under both of which conditions it has a similar Diesel standard compression ratio. Jacket cooling water is led away to a feed water tank for a boiler, so that the thermal efficiency of the set is thereby somewhat increased. The engine runs for approximately 12 hours a day; it has frequently been operated up to 20 hours a day. In external appearance there is little to differentiate this engine from standard. On the fuel pump casing is a control lever which limits the injection pump output when the quantity is to be restricted to only the ignition charge. A rod from the governor is extended upwards to operate the gas control valve, and there is a removable connecting bar between the gas control valve and a master air admission valve mounted in a casing at the end of the manifold; this casing also carries the air filter. A subsidiary drive is provided at the fuel pump (*i.e.*, left-hand) end of the engine for a B.T.H. magneto.

When running wholly on oil, with full-sized fuel pumps and sprayers, the engine can instantly be changed to the gas-cum-oil-ignition condition and run thus until it is convenient to fit the smaller diameter fuel pump and plungers and three-hole sprayers. On the other hand, when running with small pump plungers and sprayers, the engine can be turned over to run only on oil, and in this condition will carry some 66% of its normal load; full-sized injection equipment can be fitted at the first convenient opportunity.

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* From an article in the *Oil Engine*.

SUMMARIES OF INSTITUTION COMMUNICATIONS

32nd REPORT OF THE REFRACTORY MATERIALS JOINT COMMITTEE

[Publication No. 5 of the Gas Research Board]

As a foundation for subsequent studies, the temperatures and temperature gradients in the refractory fire back behind an open coke fire have been measured. Sufficient observation points were included in the survey to enable isotherms to be constructed on the whole surface and on three vertical planes through the thickness of the fire back at the centre, in the corner, and on the wing at representative times throughout the experimental period. The dissection of the fire back into four pieces as the result of experience is supported by a qualitative analysis of the stresses, but the suggestion is made that a chair-back type top brick is less likely to resist cracking than the alternative design sometimes used, made up of flat bricks. When a lightweight, clay insulating material was used in place of the normal fire back, the "pull-through" time was reduced. Replacing the rubble backing behind the normal grate back by lightweight, clay insulating bricks, cut to shape, reduced the temperature gradients after the first refuelling, slightly increased the maximum temperatures, decreased the heat conduction through the refractory, and raised the temperature at which the temperature gradient in the fire back was reversed as the fire grew low. Removing the rubble backing had the effect of increasing the temperature gradients after the first refuelling, decreasing the maximum temperatures, increasing the heat conduction and preventing the temperature gradient from being reversed. Either change from the standard rubble backing had very little effect on the "pull-through" time. The most efficient fire back, though not the most durable, would be of light-weight material, either thicker than usual or lagged.

Refractory Insulating Materials.

In the 31st Report a description was given of the preparation of dry-pressed, grogged-clay insulating bricks in which highly porous, fine-pored grog was used. The refractory fireclay used in these mixes was cylinder ground to −100 mesh. Experiments are now described in which similar products have been made from the same clay ground to −30 mesh in a solid bottom pan. The object of the work was to find whether the improvement in the product due to the use of the finer material was commensurate with the additional cost of grinding. The use of the coarser clay reduced the cold crushing strength, but led to a small gain in refractoriness-under-load. The bulk density of the bodies containing −30 mesh clay was slightly lower. It was concluded that little additional advantage was obtained from the finer grinding. The use of a proportion of ball clay in the bond was likewise not specially beneficial.

The properties of a gradated brick, prepared in the laboratory, possessing a dense and relatively slag-resistant face backed by porous insulating material, were described in the Report for last year. It was made by the dry-press process, filling the mould in three stages corresponding to the porous mixture, an intermediate binding layer and a fireclay-grog mixture for the dense face. Two methods for the production of gradated bricks in a single pressing operation have been investigated, but neither has proved suitable. In the first the mould was filled higher on one side than the other and then pressed flat. Although as a consequence there was a change in density from one side to the other, it was insufficient for the purpose in view. The second method utilized a weak porous grog. It was thought that the pressing operation might by its crushing action sufficiently consolidate the face receiving the pressure to make it slag resistant while leaving the remainder porous. In this case also the difference in density between the face and the backing was insufficient.

Further experiments on the improvement of the cohesion between the three layers of the gradated brick have indicated that when the content of porous grog for the porous section is 45% the use of 45% of dense grog for the dense face involves no differential shrinkage. These were the proportions employed in the original trials.

The slag resistance of insulating firebricks may also be increased by coating them with suitable mixtures before or after they have been built into a furnace structure. A further Paper is concerned with the properties of refractory coatings suitable for this purpose. The mixes studied were prepared from pre-calcined china clay, cyanite, or fireclay as grog bonded with ball clay, china clay, or fireclay. Additions of sodium silicate were made ranging from 0 to 5% Na_2O. The best proportion of grog was about 80%. The presence of sodium silicate reduced the spalling resistance, but more than 0.5% of Na_2O, added as sodium silicate, was needed to obtain sufficient cold strength. From the point of view of spalling, ball clay was superior to china clay as a bond for calcined china clay, and was as good as fireclay as a bond for calcined fireclay. The grading of the grog to give minimum porosity and permeability improved the resistance to attack by millscale at 1,350° C. Calcined cyanite was a more reliable constituent than calcined china clay, which tended to crack in the slag test.

Behaviour of Refractory Materials under Stress at High Temperatures.

The introductory experiments have been concerned with the behaviour of porcelain under torsion at 900° and 1,000°C. Porcelain was chosen as a convenient experimental material containing crystals in a glassy matrix. The use of torsional stress also had certain experimental advantages. Evidence has been obtained for deformation which is (i) elastic—*i.e.*, takes place immediately on both application and removal of the load, (ii) viscous—*i.e.*, the total amount of deformation is directly proportional to the load and to the time and is not recoverable on removing the load, (iii) viscous-elastic—*i.e.*, the deformation occurs at a decreasing rate and is slowly recoverable on removing the load. The viscous-elastic effect in refractory materials at high temperatures may be a useful attribute.

Further studies have been carried out on an insulating firebrick under compressive stress at 1,100° to 1,200°C. The rate of subsidence, at first extremely rapid, quickly decreased and was not found to be linear even after periods up to 250 hr. An empirical relationship applicable approximately for considerable periods is that the subsidence is proportional to the square root of the time.

Action of Alkalis on Refractory Materials.

Further confirmation has been obtained that the reaction of alkalis with alumino-silicate refractories is accompanied by an expansion when combination occurs without liquefaction—a view expressed in the Report for last year. Briquettes of mixtures of sodium aluminate and various proportions of (*a*) alumina, (*b*) sillimanite, (*c*) calcined china clay have been measured after heating at various temperatures from 1,000° to 1,400°C. Contractions were observed only at those compositions and temperatures where liquid products might be expected ; otherwise the tendency was for the briquettes to expand.

Disintegration of Fireclay Products by Mixtures of Carbon Monoxide and Carbon Dioxide.

Experiments have shown that the disintegrating action of carbon monoxide on certain susceptible firebricks at 450°C. is greatly decreased by the presence of between 10 and 25% of carbon dioxide. When the carbon dioxide content is reduced to 5%, the tendency for the products to disintegrate is as great as, if not greater than, with pure carbon monoxide.

Action of Chlorine on Refractory Materials.

As a result of exposing samples of firebrick to chlorine at 1,000°C. for 20 hr., a loss in weight of 1.25% occurred through volatilization of iron and other chlorides. The physical properties of the firebrick remained practically unaltered. Another product originally susceptible to disintegration by carbon monoxide at 450°C. was rendered inert by similar chlorine treatment.

A diatomite product was chlorinated for 10 hr. at 1,000°C. The resulting material was appreciably more refractory. It suffered less after contraction and deformation under load at 1,200° and 1,300°C. than the untreated brick, and was also superior in this respect to a product which had received similar heat treatment omitting the chlorine. The crushing strength was intermediate between those of the untreated and the heat-treated samples.

Permanent Expansion of Silica Products Containing Cristobalite.

Although the thermal expansion of unused silica bricks from 20° to 1,000°C. is usually completely reversible, silica bricks which have been in service at 1,600°C., or have been heated to this temperature in the laboratory, may show a permanent growth when their thermal expansion is determined. The permanent growth is attributed to the cristobalite; it occurs between 200° and 500°C., which includes the inversion temperature range of cristobalite, is largely unaffected by the rate of heating, and is diminished by the application of external stress.

Examination of Retorts Used for the Manufacture of Activated Coke.

In the process used for the manufacture of activated coke 0.5% sodium carbonate and 1.25% calcium carbonate are uniformly mixed with the coal charged to the retorts. Aggravated slag action on the retort walls is therefore a distinct possibility. Four retorts at the Garston Works of the Liverpool Gas Company, which had been used for this process for 17 months, were inspected together with two others in the same setting which had been worked normally. The four retorts which had been used in the activated coke process showed erosion of the lower courses of the silica brickwork just above the sliding joint, especially in the corners. The two normally worked retorts showed a less marked action in similar positions. Analyses of affected brickwork indicated the presence of increased quantities of alkali and of lime in the surface layers. Attention is directed to the possibility of increased erosion and slag action in the producers and combustion chambers if activated coke is employed.

Specifications Sub-Committee.

The Specifications Sub-Committee has continued its work of preparing recommendations for the revision of the Standard Specification for Refractory Materials for Gas-Works, and this work has

been co-ordinated with that of the Testing Committee of the British Refractories Research Association. The Sub-Committee's recommendation regarding an alteration in the Refractoriness Safety Test for Siliceous Material has been adopted.

INSTITUTION GAS RESEARCH FELLOWSHIP REPORT, 1939–40

[Communication No. 244]

By J. S. FORSYTH, B.Sc. (Institution Gas Research Fellow), D. G. R. DAVIES, B.Sc. (Corbet Woodall Scholar), and D. T. A. TOWNEND, D.Sc., Ph.D., D.I.C. (Livesey Professor).

This Report covers work completed during the final sixteen months' tenure of the Institution Gas Research Fellowship by J. S. Forsyth, in collaboration with D. G. R. Davies, Corbet Woodall Scholar.

An Interim Report (1939), covering the first eight months' tenure of the Fellowship, dealt with the Inflammable Ranges of Ethylene-Air Mixtures at Atmospheric and Reduced Pressures and the Influence of Small Amounts of Nitrogen Peroxide thereon; a natural sequence of this field of work was the measurement by the static method of (*a*) flame velocities in tube experiments, and by the dynamic method of (*b*) ignition velocities in aerated burner flames. An account of the work so far completed under (*a*) will be published at a later date; that under (*b*) has developed in a most interesting manner and is dealt with in the present Report.

Whereas in previous investigations by the burner method the area of the flame has been calculated on the assumption that the inner cone of an aerated flame approximates to a true cone, in the present investigation this area has been directly measured, with the result that ignition velocities have been shown to be independent of such factors as rate of mixture feed, burner diameter and flame shape, and dependent solely upon the working temperature and pressure. The study has so far covered a number of ethylene- and carbon monoxide-air mixtures over a wide range of experimental conditions. Ignition velocities determined by methods in which the area of flame surface is not directly measured, and also by the cone angle method of F. A. Smith and S. F. Pickering, are usually subject to error.

As a result of the present investigation, the importance of the "dead space" between the head of the burner and the base of the flame became apparent, and the variation of this factor with rate of flow, pressure, and mixture composition has been determined with ethylene-air mixtures.

Finally, the influence of "dead space" on the "light-back" propensities of inner cones has been clarified, and an expression derived for "light-back" in terms of ignition velocity and "dead space." The factors influencing "dead space," which is accepted essentially as the thermal gradient in which the combustible gas-air mixture concerned is raised to the "ignition point," are being made the subject of further enquiry.

INSTITUTION GAS RESEARCH FELLOWSHIP INTERIM REPORT, 1941

[Communication No. 245]

By J. E. GARSIDE, Ph.D. (Institution Gas Research Fellow), A. R. HALL, M.Sc. (Smithells Scholar), and D. T. A. TOWNEND, D.Sc., Ph.D., D.I.C. (Livesey Professor).

This Interim Report covers work carried out during the first four months' tenure of the Institution Gas Research Fellowship by J. E. Garside, in collaboration with A. R. Hall (Smithells Scholar).

In the previous Fellowship Report, 1939–40, the importance of the influence of the "dead space" between the head of a burner and the base of the flame on the "light-back" propensities of aerated burner flames was indicated; a natural sequence of this work has been an investigation into the possibility of applying the knowledge thus obtained to control "light-back" in commercial gas appliances.

A simple method of assessing "dead space" by determining the limiting burner diameters for flame propagation has been developed, and measurements have now been made of these diameters, using the aerated flames of a number of simple combustible gases as well as of some typical commercial gaseous fuels. The importance of the chemical composition of the supply on its "light-back" tendency has been emphasized, experiments having shown that the addition of small quantities of ethylene to coal gas may cause relatively large changes in limiting diameter. Similar effects on "light-back" have been observed when the gas supply is debenzolized.

The second factor affecting flame stability, namely, "blow-off," has also been studied. "Blow-off" limits of the flames of both simple and commercial town gases have been determined on burners of varying diameter, and the variation of this factor, both with mixture composition and burner diameter, demonstrated. In addition, results obtained while using split flames, double-cone flames, and non-aerated flames, have shown the effect of the type of flame on "blow-off" limits. Finally, a tentative explanation of the mechanism of "blow-off" has been advanced.

Although the work has been preliminary in character, it is brought at once to the notice of the Gas Industry in order to promote discussion of its potentiality in any consideration of combustion characteristics and future gas supplies.

FUEL ECONOMY

At a meeting held in Sheffield on Feb. 16 to discuss questions of fuel efficiency and economy, the speeches included interesting contributions from representatives of the gas and coking industries. The meeting, held in the Lecture Hall of the Central Public Library, was jointly arranged, at the request of the Mines Department, by 17 technical societies, among which were The Institution of Gas Engineers and the Coke Oven Managers' Association. Dr. W. H. Hatfield, F.R.S. (President of the Sheffield Society of Engineers and Metallurgists and Vice-President of the Iron and Steel Institute), presided.

Dr. R. J. SARJANT (Member of the Fuel Efficiency Committee of the Mines Department), in the course of a general statement on the situation and what required to be done, said a special request was made for a saving of 5% in gas consumption. This could be done by attending to everyday matters.

Mr. CHAPMAN (Chairman of the Industrial Fuels Committee) explained why this economy in gas was asked for. "Fuels are scarce," he said; "graded fuels are particularly scarce. Coke ovens are designed to give their maximum output of gas on an optimum type of fuel. Coke ovens, like you and all of us in our own works, are not getting the optimum types of fuel. They are getting fuels of qualities which are far from ideal. At the present time they are also getting fuels with a high percentage of moisture.

It had been the intention of Mr. RALPH HALKETT, of the Sheffield Gas Company, to attend the meeting and make some observations, but he was unable to be present, and in his absence Dr. H. ALEX FELLS read his remarks as follows:

Since the visit of Dr. E. W. Smith, the Director-General of Gas Supply, and his survey of steel works in the area, and following upon the appeal for the appointment of "gas chasers" by each firm, practical co-operation between the steel firms and my Company has developed even further. The staffs of my Industrial and Research Departments have devoted still more of their time since last November to giving both technical and practical assistance to many firms on the subject of gas economy. They have so far visited over a hundred firms, large and small, and have made every endeavour to show how gas can be used to the fullest possible advantage in gas furnaces of all types and for most of the heating processes carried out in the steel industry.

In some cases they found that considerable economies had already been made through a proper interest being taken by the managements of the firms, and by the appointment of special men to act as "gas chasers." In other cases there was every evidence that gas had been used for many years in a way which indicated a sound knowledge of practical technique of combustion and furnace control, and a keen judgment of the financial advantage to be had by the use of such technique.

In a certain few instances the matter has so far had but little attention, since so many other equally essential factors command the attention of managements just now. Those firms no doubt, in normal times, were mindful of their fuel bills, although they fully realized that fuel cost may not have been a high proportion of the total cost of production. But to-day they are prepared to sacrifice many things, even cost, in order to maintain high rates of output. With the other firms visited, the possibilities of gas saving were only too obvious, and could be divided into two main classes—wastage due to lack of care in the practical use of furnaces, and wastage due to incorrect combustion of the gas because of the absence of technical control.

Dr. FELLS, having read Mr. Halkett's remarks, went on to give some particulars of the results of the work of the "gas chasers" in the city. He said that one firm, where the gas-chaser incidentally was the works manager himself, by making greater use of the hearth area of the load-recuperator furnace for heating special steels for forging, reduced the gas consumption per ton of steel heated by 20%. The output was increased by about 30%, and on this increased output the amount of gas saved was 460,000 cu.ft. per month, *on one furnace*.

Light forgings were being heated in six small furnaces. The work was then concentrated in five furnaces, and each furnace was used to a greater loading capacity. The rate of output was increased, and the gas saved per unit of steel was 40%, a saving of 511,000 cu.ft. per month. In the annealing department, one furnace was fired by an air/gas mixture, from a compressor. This mixture carried oil into the air inspirator throats, and the dust in the inspirated air was held in

the burners. After the burners had been cleaned and readjusted to give proper combustion, the gas reduction per ton of annealed steel was 13%, or 125,000 cu.ft. per month. This gave a total saving, by improvement in the practical use of but a few furnaces, of well over a million cu.ft. per month, a result due to the interest taken by the works manager.

Another firm, where the need for gas economy had been duly impressed upon shop managers and furnacemen, a battery of twelve small furnaces was shut down completely instead of only partially when the furnaces were not in use. The gas consumption was reduced from 87,000 cu.ft. a day to 63,000, a saving of 24,000 cu.ft. per day, or 27%.

Certain other firms, in addition to preventing wastage of gas by similar methods to the above, had adopted scientific control methods. The quality of combustion had been tested by analysis of the flue gases, and the amounts of excess air or excess gas accurately determined. By proper adjustment of gas and air valves, damper control, and the elimination where necessary of air in-leakage through doors, insufficiently sealed bogie-hearths, or any other openings in the furnace structure, very considerable reductions in the amount of gas used had been made. It should be appreciated that wastage of heat due to incorrect combustion or excess air from any cause was an item which occurs all the time the furnace was used. The savings of gas by eliminating this waste were definite and continuous, provided the necessary types of gas and air valves were installed on the furnace, and that some means of indicating to the furnacemen when the combustion quality was right was provided.

With one firm, on one furnace alone, the first to be examined and adjusted by flue gas analysis methods, the gas consumption was reduced from 3,760 cu.ft. per hour to 2,800 cu.ft. per hour, without any drop in temperature or output. This represented a saving of over 25%, which with proper care could be maintained regularly.

Other furnaces were tackled in the same way, with corresponding savings in the gas used. By the use of these methods and general care throughout the works, an all-round saving of 10% of the gas had been made, which, on an annual consumption measured in hundreds of millions of cubic feet, was no small amount.

Mr. G. W. J. BRADLEY (Coke Oven Managers' Association) made a plea for a more sympathetic understanding of the man-power needs of coke oven plants. This was particularly the case in regard to maintenance. It was little use building and staffing armament works if these were to be brought to a standstill by reason of inadequate labour at the fountain head from the point of view of both quantity and quality.

THE FUTURE OF COKE*

By J. G. BENNETT,

Director, British Coal Utilization Research Association

(*Continued from p. 315*)

(e) Special Furnaces

Oven coke of low reactivity offers the possibility of developing very high temperatures by making use of recent advances in our knowledge of combustion. At the B.C.U.R.A. a coke-fired furnace has been developed which is capable of giving temperatures approaching 2000°C. with very much simpler accessories than are required for a gas-fired furnace of similar performance. These developments are dependent on the one hand on the use of a coke of high quality as regards low ash content, uniform ash distribution, high density and low reactivity, and, on the other, on the availability of refractories able to withstand the action of molten slag at the very high temperatures involved. Apart from the production of very high temperatures, say, of 1750°C. and upwards, coke-fired furnaces hold out very interesting possibilities in the range from 1550° to 1750°C.

All this work is still in the early stages, but looking forward as we are now doing to developments extending over the next 10 or 15 years, I think that we may expect very important new uses for coke to materialize along these lines. If we can make furnaces of reasonably low capital and operating cost to work at various temperatures between 1500° and 2000°C., industrial processes can be exploited which have hitherto been the exclusive prerogative of countries where cheap hydro-electric power is available, as well as entirely new processes at present in the stage of laboratory experiment. I foresee the possibility of a very large market for high grade oven coke at lucrative prices in this field. Indeed, it is along these lines that I foresee coke coming into prominence as the basis of quite new industrial processes which at present could not be established for lack of a suitable source of energy. The encouragement of such developments will, no doubt, be an important factor in post-war reconstruction.

(f) Water Gas Manufacture

The production of water gas is at present regarded as ancillary to carbonization as a means of securing flexibility. Its future possibilities as a source of hydrogen and carbon monoxide for various synthetic processes are of great importance. This is an aspect of complete gasification which is rather different from that which we considered earlier. Here we have in mind not the production of a gaseous fuel so much as raw materials of chemical industry. Hydrogen, carbon monoxide, and methane, in the hands of the high-pressure chemist, become sources of raw materials of the aliphatic chemical industry, the potentialities of which can scarcely yet be envisaged. The time is coming when the petroleum resources of the world will reach the zenith of their development and a policy of conservation will impose itself on the oil-producing countries of the world. Oil prices will rise, and liquid fuels will be used only in applications which make the fullest use of their valuable characteristics. This is a situation which may begin to take shape within one or two decades. We shall, at the same time, see an increasing demand for the production from coal of oil substitutes and of alternative raw materials for chemical industry. In these developments water gas has a great part to play and this, in turn, will create a special demand for coke, the extent of which it is impossible to forecast.

(g) Open Coke Fires

Finally we come to the open fire. This is a market upon which covetous eyes have been cast by all the industries which supply energy to the home. Gas fires, electric radiators, central-heating systems, anthracite stoves, open-coke grates, all seek to displace the bituminous coal fire, regarded by some as a hopeless anachronism, and by others as the living symbol of the English home. It has been freely suggested in the past that the 25 million tons per annum of coal which are used in open fires could, and should, be replaced by smokeless fuels. I consider that the possibility of doing this without coercive legislation was fairly well tested in the years preceding the war, when an ably conducted campaign of propaganda against the open fire on the score of inconvenience, smoke nuisance and inefficiency was undertaken by both the gas and electrical industries. Very little impression on the market for house coal was made. Particularly instructive were the endeavours of local authorities, for example, in Glasgow and in Manchester, to compel tenants to use coke or gas in place of coal. Coke grates installed free of charge and special facilities for obtaining supplies of coke did not avail against the powerful attraction of the coal fire with its comforting flames and lively appearance. I consider that, on the whole, the endeavours to introduce gas coke as an open-fire fuel have been unsuccessful, and I think that this applies to a lesser degree to low-temperature cokes also, although the latter are still regarded as luxury fuels and occupy a rather special position. Coke grates in which coke is actually burned constitute a minority of those which have been installed. So far as our enquiries go, it appears that coke grates have been rather unsuccessful in private living-rooms, but much more popular in public-houses, waiting-rooms, and other places where it is feasible to keep a large fire burning continuously, these being the conditions which most favour the use of coke.

It would clearly be very desirable to replace coal, especially in large cities, by smokeless fuel, provided the traditional comforts of the English home life are not impaired. I do not, however, consider that even with the best qualities of gas coke now on the market this latter condition can be fulfilled. The Gas Industry will have to consider the production of more reactive and cleaner cokes than has hitherto been contemplated, and will have, moreover, to envisage alkali activation of such cokes to give them the requisite liveliness.

Since the alkali activation of coke was first proposed by Cobb and confirmed by Nicholls in the United States([48]), its possibilities were neglected by the Gas Industry until the Liverpool Gas Company began manufacture on a commercial scale in 1936. Reports on the activation process have been made by Thomas and Askey([66]). In 1939 Brewin and Mott([13]), after reviewing the various methods by which reactive coke can be made, concluded that in many respects alkali activation is the most favourable. An important advance in the technique of activation was reported in 1940 by Askey([66]), who showed that sodium carbonate could be sprayed on to the coke after carbonizing.

Alkali-activated coke of the best possible quality is a good open fire fuel, but, even so, I do not think that coke will readily displace the open coal fire. I base this belief on the fact that the open coal fire as it now stands is susceptible of great technical improvements. Work to this end has been undertaken by the coal industry, and I believe that we shall have in future coal fires of higher efficiency than at present. I think we should be able to get coal fires without waste heat recovery which will have an overall thermal efficiency of 40%,

* Paper presented at a Joint Meeting of the Coke Oven Manager's Association and the Institute of Fuel together with the Iron and Steel Institute and The Institution of Gas Engineers, Feb. 25.

made up as to 35% direct heating of the room in which they are situated and 5% work of necessary ventilation. With waste heat recovery in the form of back boilers or heat exchangers to provide warm air in upper rooms, over-all efficiencies of up to 55% should be obtainable. Coal fires should, moreover, be much less smoky than in the past, easier to lay and to light, capable of staying in all night on very low fuel consumption, and convenient for the removal of ash and dust in the morning. All these advantages should be obtainable without any sacrifice of the psychological attractions which have given the coal fire such a strong hold over the affections of the nation. If such is to be the coal fire of the future, coke will have to make great strides if it is to capture any large proportion of the market. Nevertheless, I still think that the use of coke in open fires can be extended, and the present consumption of 325,000 tons increased at least fourfold provided, as I have said, the quality of coke is considerably improved and efforts are concentrated upon those applications where the characteristics of coke show to the best advantage.

(h) Other Possibilities

The use of coke as a source of energy for drying processes is already well established, though I have referred to the great scope for expansion in crop drying. The growth of chemical industry will increase the use of thermal drying and other processes where on the one hand cheap heat, and on the other, reasonably clean gases are required.

Agricultural uses of coke in soil warming and orchard heating have already been developed by the London and Counties Coke Association.

Coke is used in countries with cheap power for the manufacture of calcium carbide([22], [49]). Many attempts have been made to develop large-scale carbide manufacture in this country. We ought to have it, and it will probably come.

The production of electrode carbon from special low ash coal is already an established process likely to grow in importance with-the increasing demand for aluminium and magnesium([49]).

Coke has a steady market as a filter medium([70]). Its use as a filler for various purposes is likely to increase with better knowledge of its physical chemistry. This applies to an even greater degree to the production of active coke for adsorption purposes.

6. The Quality of Coke

Coke always has been a variable and uncertain commodity. Like the little girl in the nursery rhyme, supplies can run the whole gamut from unsullied purity to a product for which engineers and even housewives would use a stronger epithet than "horrid." That the variability of coke quality has been a source of complaint all over the world is illustrated by the statement of Nicholls (U.S. Bureau of Mines)([48]) that:

> "It will be agreed that the reputation of coke used often to be none too good; the viewpoint of householders could be expressed by saying that they could not be bothered with it; that it required too much attention; it either all burned away or the fire went out, although there was plenty of unburned coke in the furnace; and that in cold weather such bad clinkers were formed that the fire had to be rekindled after removing them. It is true that the burning characteristics of coke as compared with other fuels may have permitted such conditions, but the causes are preventable. In many districts coke was a by-product, and little effort was made by the producers to supply it in the right size or to give the service needed. This was particularly the condition when it was distributed through dealers who had not the proper facilities for storing and handling it, nor sufficient interest in promoting its sale."

The present position of coke supplied by the two main branches of the carbonization industry corresponds to the relative importance to each of them of gas and coke as marketable products. The coke ovens produce coke of uniform quality by crushing and blending and by the conditions of carbonization which obtain in coke ovens. Not only are coal supplies carefully controlled, but the ash is far more evenly distributed throughout the coke than is possible when larger sizes are carbonized in horizontal or vertical retorts. The Gas Industry, on the other hand, which is mainly concerned with the production of the maximum therms of gas per ton, has paid relatively little attention to coke quality, though admittedly very great improvements were seen during the last decade before the war. The question of ash distribution is not easy to settle, as for some purposes a uniform distribution is best, and for others it is useful to have the ash in lumps.

Does this mean that the Gas Industry cannot produce good coke without sacrificing gas production? Obviously not, because cokes have been and are being produced under commercial conditions which are altogether excellent fuels both as regards quality and constancy of characteristics, but they constitute a small proportion, say 15%, of the whole. Reasonably good coke is produced by perhaps 60% of the remaining gas companies, leaving perhaps 25% of doubtful and uncertain quality which does not do the coke market any good. I am not here considering the question of uniformity and constancy of size, for this is a matter which depends upon fewer factors than does quality, and can be, and has to a great extent been, regulated by the work of the Coke Associations.

A special form of high grade coke is produced by low-temperature carbonization. This has become the principal product of the low temperature carbonization industry, although in the early days—to quote the original terms of reference of the Fuel Research Board—the aim was "to produce oil for the Navy and smokeless fuel for the home."([4])

In the early days of low-temperature carbonization, "oil from coal" was to be the major achievement, but to-day the only commercially successful processes rely for their credit balance in their profit-and-loss account upon the high price commanded by a highly reactive semi-coke. It is a most striking fact, the importance of which we must not overlook, that for the past ten years the public has gladly been paying nearly double the price per ton for a fuel which has no advantage over gas coke except high reactivity and a few per cent. extra volatiles. With advancing knowledge of the technique of carbonization there is no reason to suppose that such fuels cannot be produced in the future without the loss of gas make which is chiefly responsible for their high cost.

It is obvious that for any given application a compromise must be made. There is a certain optimum balance of price and quality which could be worked out from a knowledge of the influence of quality on efficiency as well as labour and maintenance costs. A theoretical plan of coke production would therefore call for as many grades and qualities as there are applications. When, however, we stop to make calculations, it becomes clear that the economic optima fall into two distinct groups, one of which is dominated by the cost on a thermal basis, and the other by considerations of performance—*i.e.*, one where high level of performance and the other where low level of cost is the determining factor.

So clear is the division that in many cases cokes falling into these two groups would not be interchangeable at all. Very high grade cokes could not, for example, be used for steam raising or large central-heating boilers, because they would not be competitive with other sources of energy on the score of cost. On the other hand, low-grade cheap cokes could not be used at all in open fires, portable gas producers, or some of the other applications considered in the previous section.

I think that the foregoing discussion shows that there are three factors which outweigh all others in determining the value of coke for uses other than the blast furnace and the cupola. These are *purity*, *reactivity*, and *cost*. In Table III is shown the importance of these factors for different applications.

The standardization of oven coke quality owes much in this country to the work of Mott and Wheeler([44]). The American Society for Testing Materials([1]) has had for many years a committee developing tests for coke. Similar organizations have been at work in Germany([69]) and Russia. Although the International Standardization Committee I.S.A. 24 was intended to prepare an international specification for coke tests, little progress had been made until the Paris Meeting in 1938 when the British Standards Institution was invited to act as reporters in succession to the Polish National Committee. On the whole, there does not appear to have been much international co-operation either in coke research or in developing standard specifications.

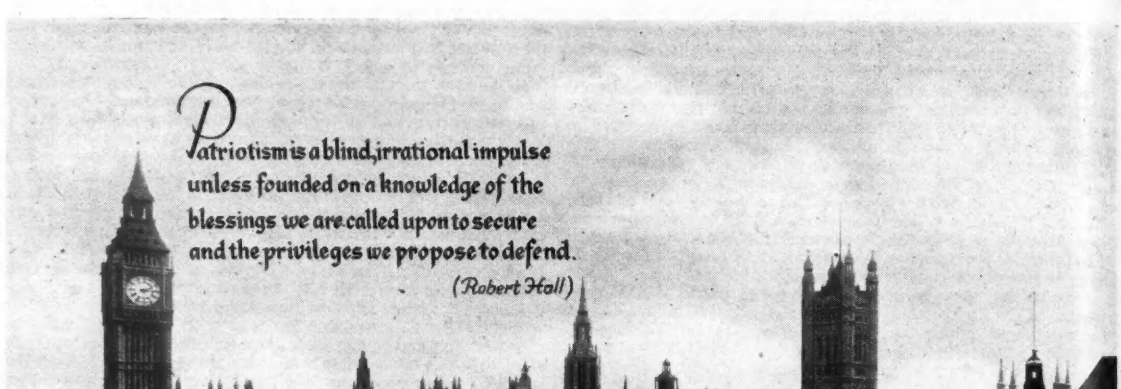
TABLE III.—Factors Determining the Suitability of Coke for Various Purposes.

	Purity.	Reactivity.	Cost.
General industry	—	—	XXX
Water boilers	X	X	XXX
Special domestic equipment (gravity-fed cookers, &c.) ...	XX	XX	X
Open fires	XXX	XXX	X
Gas producers	XX	XXX	—
Special furnaces	XXX	XXX	—
Water gas plant	X	X	XX

Gas coke has advanced steadily in quality in the areas of the London and Counties Coke Association and of the leading gas companies. There is still much room for improvement. In particular, a high moisture content should be regarded as completely inadmissible for any grade of coke. Whatever this may involve for the Gas Industry in the way of modification of quenching practice in old installations, the sale of coke with more than 5% of moisture should be actively discouraged by the coke associations. So far as ash content is concerned, we can expect, after the war, the general supply of coals for gas making of 5% ash content or less. Such coals may be more expensive than those purchased by the Gas Industry in the past, but the resulting cokes will command a price which will more than justify the policy.

Finally, we have the question of reactivity. Sound tests for reactivity are now available, and useful work has been done recently on the standardization of the Critical Air Blast test which is now satisfactory for testing cokes. Cokes will, in my belief, have to be sold in the future in definite reactivity groups. A C.A.B. of over 0.080 is wanted for very high temperatures. Between 0.070 and 0.055 is good for boilers. 0.035 to 0.045 will serve for water gas manufacture, for coke grates, and for stationary gas-producers. 0.025 to 0.030 is wanted for stool grate type open fires, portable gas producers, carbon disulphide manufacture, and similar special purposes.

(To be continued)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unless founded on a knowledge of the
blessings we are called upon to secure
and the privileges we propose to defend.
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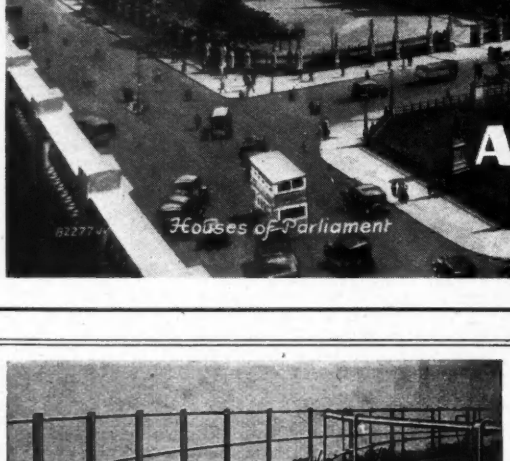

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STANDARDIZATION OF APPARATUS*

By A. H. DYER (Newport, Mon.)

I THANK you for the honour you have done me in electing me your Representative to meet the Committee of the Institution elected to discuss the standardization of appliances.

Some companies have already practised a partial form of standardization inasmuch as they have adopted certain makes of cookers only. This has meant a considerable reduction in the number of spares it has been necessary to keep in stock, with consequent saving in maintenance. One point has to be borne in mind, however, and that is a question of policy—whether it is not wise to offer to the public every type of cooker, especially as they were so extensively advertised in pre-war days. Against this must be weighed the serious disadvantage of having so large a variety of types on the district. The cost of carrying spares to meet maintenance requirements has been enormous.

When considering the question of standardization it will be readily realized that it is vital for a gas undertaking to run a complete maintenance scheme if it is to meet competition which, already severe, will be greatly intensified when normal times return. While we have progressed in the efficiency of apparatus in recent years, our competitors have also gone forward, and the fight will be intense for the domestic load. Our competitors are themselves considering similar problems and methods of attracting the sale of domestic appliances. It will be up to every undertaking to see that the good work done by salesmen in the selling of apparatus is not nullified by failure to maintain the apparatus in perfect working order. After all, the sale of apparatus is only a foundation on which the output is built.

As you are all aware, a standard cooker was brought out by the National Gas Council in 1922, and you will not need reminding of the result. In my opinion complete standardization would be a retrograde step and I base this opinion on several factors :

1. Most appliances are chosen by ladies, who like to have a reasonable range of goods from which to choose. During the period preceding this war a large number of new houses were built. Many salesmen will remember the variety of apparatus sold on a given housing estate as each consumer endeavoured to be somewhat different from the others. While this may be an argument for standardization, I do suggest that whatever is adopted as the post-war policy, a fair range of designs (if not technically different) giving variety in external appearance should be offered to our consumers.

2. Would not complete standardization tend to stifle progress? It would be necessary to obtain very amicable arrangements between manufacturers, and there is the possibility of new inventions, however good, being held up for some considerable time owing to lack of co-operation and the possible inability of manufacturers to agree terms on which patents could be used by each other.

3. Different districts find that certain apparatus are not only more favoured but are also more suitable to the needs of the district than others. Would it be possible to make a standard cooker which would suit all the requirements of consumers in every area? In my opinion this could not be done. For instance, we have certain districts in this country where bread is made at home and a different type of oven is required from other parts where only small goods are cooked.

There are, however, a number of items on appliances which I think could very well be made standard.

Thermostat.—There does not appear to be any real difficulty in obtaining uniformity of the indicator. At present some are lettered, others are numbered but give different temperatures for the same number. Prior to the war many journals gave recipes by cooker manufacturers with instructions to set the thermostat at a certain figure or letter. You will recollect the numerous enquiries received for the correct setting of thermostats for the particular recipe made by consumers owning other makers' cookers.

Taps.—Standardization would make for very easy maintenance, would cheapen the cost considerably, and would save carrying a large number of different spares, as is the case at present.

Governors and Fixed Injectors.—Most people will agree that generally speaking this is a great advance on the usual practice of supplying cookers with adjustable injectors and without governors. Few companies can supply at constant pressure, and consequently by the older method the adjustment will depend to a large extent on the period of the day when the apparatus is adjusted by the fitter. This question is, however, correlated to that of the standardization of calorific value, which now ranges from 200 to 600 B.Th.U. in the Industry. If C.V. standardization were carried out, the number of sizes and fixed nipples would be considerably reduced and a great deal of trouble saved when apparatus is taken from one district to another.

Cooker Flue Spigots.—So many sizes and shapes of flue spigots are fitted that it is not possible to use a standard fitting to connect to the flue pipe. There does not appear to be any reason why a standard shape and size cannot be decided upon which would enable a standard connexion to be manufactured. At present those using asbestos pipe for flues usually make their own connexions in sheet iron, which is an expensive item and has not the life of asbestos.

Hotplates.—The hotplate is perhaps the most important part of the cooker. Standardization of this would mean a great saving in maintenance and cost of renewals. I cannot see that a standardized form would in any way detract from the appearance.

A great difficulty in the past has been that a large number of undertakings have forced manufacturers to make alterations in design to meet their particular requirements or ideas. If standardization or partial standardization is adopted it will be essential for undertakings to choose those models most suited to their requirements and not to ask for minor alterations.

I would suggest that a Committee of the Institution, with co-opted members from Senior and Junior Associations and also the Salesmen's Circles, should be formed to go into any modifications or improvements suggested by the makers or by the Industry.

* Paper to the Wales and Monmouthshire Junior Gas Association, Feb. 21.

COMPANY MEETING

Cambridge University and Town Gas Light Company

An assurance that, despite the proposed increase in the price of gas by London Companies, no increase is contemplated by the Directors of the Cambridge University and Town Gas Light Company, was given by the Chairman of Directors (Mr. J. F. Cameron), at the Ordinary General Meeting of the Company, which was held on Friday, Feb. 27, at the Head Office, 52, Sidney Street, Cambridge. He was supported by the following Directors: Mr. F. J. Dykes (Vice-Chairman), Major H. McCombie, Mr. H. T. Wing, and Mr. G. F. Dale; Mr. J. Hunter Rioch (General Manager and Secretary) and Mr. W. R. Elworthy (Auditor).

In submitting the report of the Directors, the Chairman regretted that by Order of the Board of Trade his usual survey of the activities during the past year could not be given. The Chairman made a strong appeal for the utmost economy to be exercised in the use of gas, and warned the public that unless supplies were voluntarily restricted compulsion might be introduced, which would not only be inconvenient, but difficult to work. He warmly thanked Mr. J. Hunter Rioch, and the staff for their continued loyalty and valuable work during the year.

The Chairman's motion that the report of the Directors be adopted, and that a dividend for the half-year ended Dec. 31, 1941, at the rate of 5% on the Ordinary Stock, 3½% on the "B" Stock, and 2½% on the "C" Stock, subject to income-tax, be paid on Feb. 28, was carried after being seconded by Mr. F. J. Dykes, making a total for the year of 10%, 7%, and 5% respectively.

Major H. McCombie was re-elected as a Director, and Mr. W. R. Elworthy as the Company's Auditor.

A vote of thanks was passed to the Chairman, Directors, General Manager and Secretary, and the employees for their yeoman work during the past difficult year.

At the Croydon Gas Company's Annual General Meeting held on Feb. 27 the Directors' recommendation that dividends in respect of the half-year ended Dec. 31, 1941, should be paid at the rate per annum of 4% on the Preference Stock, 5% on the Maximum Dividend Stock, and 6% on the Sliding Scale Stock, all less income-tax, was agreed.

In their Report for the year ended Dec. 31, 1941, the Directors of the South Metropolitan Gas Company express regret that, after payment of interest on the Debenture Stocks, they are unable to recommend the payment of any dividend on the Ordinary or Preference Stocks for the year 1941.

At the Annual General Meeting of the East Surrey Gas Company, over which Mr. W. H. Bennett, Deputy Chairman, presided in the absence of Mr. W. Lees Stenning, Chairman, the following dividends were declared, all less income-tax: 6% on the Cum. Pref. stock; 4½% on the Redeemable Pref. Stock; 5½% on the Pref. "A" Stock; and 5% on the Ord. "B" Stock.

The Need for absolute economy in the use of gas was emphasized by Mr. John E. Daw, Chairman of Directors, at the annual meeting of the Exeter Gaslight and Coke Company, when dividends were declared at the following rates per annum for the six months ended Dec. 31 last: 4% on the preference stock, 5% on the preference shares, 7½% on the new ordinary shares, and 10% on the original stock, all less income-tax.

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Gas Products Prices

The London Market Mar. 9.

There is very little movement in the prices of Coal Tar Products, as many of the usual markets are no longer available and pitch/creosote mixture as a fuel oil has taken their place.

Pitch is still a nominal market, but for such quantities as are being sold the price ranges between about 45s. and 50s. per ton. Creosote is about 5d. to 6d. per gallon. With regard to refined tar the price for next season has not yet been definitely fixed and it is expected that this will come under a Direction to be issued by the Coal Tar Controller. Pure toluole remains 2s. 5d. per gallon under the Ministry of Supply Toluene No. 2 Order. Pure benzole is about 1s. 10d., 95/160 solvent naphtha is 2s. 5d. to 2s. 9d. and 90/160 pyridine remains about 13s. 6d. per gallon. All the above prices are *ex* Makers' Works. Naphthalene prices are unchanged and are in accordance with the Control of Tar Order 1941. The Order refers to maximum prices, and the figure for refined crystal naphthalene in 2-cwt. bags and 4-ton lots is £23 per ton delivered.

The Provinces Mar. 9.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¼d. to 4¾d.; Scotland, 4¼d. to 4¾d.; low gravity, 4¼d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6½d.; filtered heavy oil (min. gr. 1,080) 6½d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland Mar. 7.

Steady conditions prevail. Refined tar 4¾d. to 5d. home and 4¼d. to 4½d. per gallon export. Creosote oil: Specification oil, 6d. to 6½d.; low gravity, 7d. to 7½d.; neutral oil, 6½d. to 6¾d. per gallon; all *ex* Works in bulk. Cresylic acid: Difficult with prices nominal. Pale 99/100%, 4s. 9d. to 5s. 3d.; Pale 97/99%, 4s. 3d. to 4s. 9d.; Dark 97/99%, 4s. to 4s. 3d. per gallon; all *ex* Works in buyers' packages. Crude naphtha, 6½d. to 7d. Solvent naphtha: 90/160 grade 2s. to 2s. 3d. and 90/190 Heavy Naphtha 1s. 9d. to 2s. per gallon. Pyridines: 90/160 grade 13s. and 90/140 grade 15s. per gallon.

Gas Stocks and Shares

Although business generally in the Gas Market was on a smaller scale last week, it was evident that supplies of fixed-interest stocks were a little heavier than usual and several of these were marked up. The Far-Eastern situation, however, led to a further drop in Oriental stock.

Now that the majority of final dividends for 1941 have been paid or announced it is satisfactory to note that, with few exceptions, the rates are comparable with those for 1940, and if these can be maintained the yields at current prices are, in a number of cases, very attractive. Having regard to the number of enquiries and waiting lists of purchasers, if the present lull in air attacks on this country continues it would not be surprising to see prices considerably improve.

OFFICIAL LIST

Brighton Cons. (*x.d.*)	64—69	Mar. 2
British Ord.	72—77	+1
Commercial 3 p.c. Deb.	57—62	+2
Croydon max. Div.	82—87	+2
Imperial Continental	52—57	−1
Oriental	100—110	−2½
South-Eastern Gas Corporation 4½ p.c. Pref. (*x.d.*)	15/6—17/6	Mar. 2
Ditto 4 p.c. Pref. (*x.d.*)	12/—14/-	"
South Suburban Ord.	71—76	+1
Ditto 4 p.c. Pref.	70—75	+2
United Kingdom Gas Corporation 4 p.c. Pref.	15/—17/-	+-/6d.
Ditto 4½ p.c. 2nd. Pref.	14/6—16/6	+-/6d.
Watford Ord. (*x.d.*)	87—92	Mar. 2

PROVINCIAL EXCHANGES

Liverpool Ord.	100—102	Mar. 2

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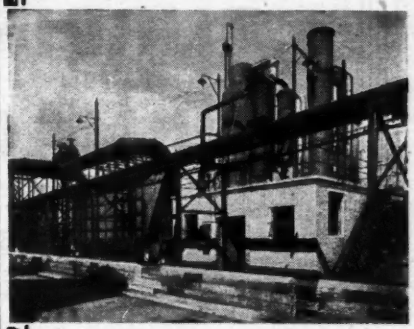

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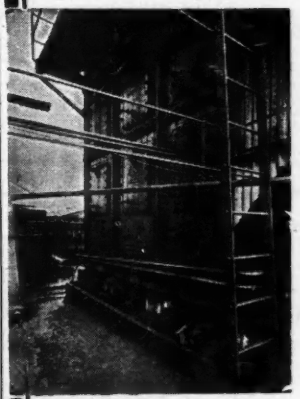

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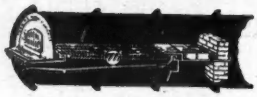

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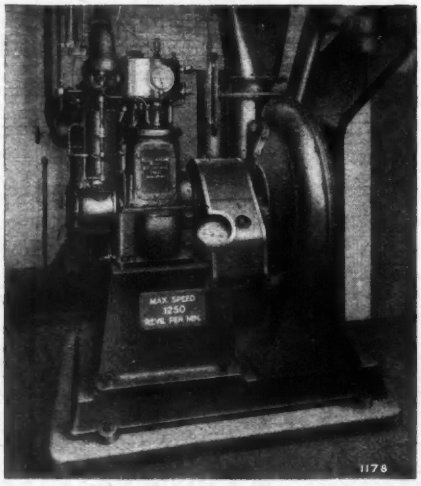

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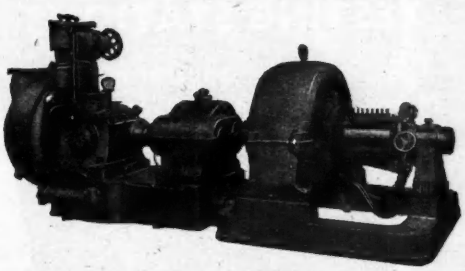

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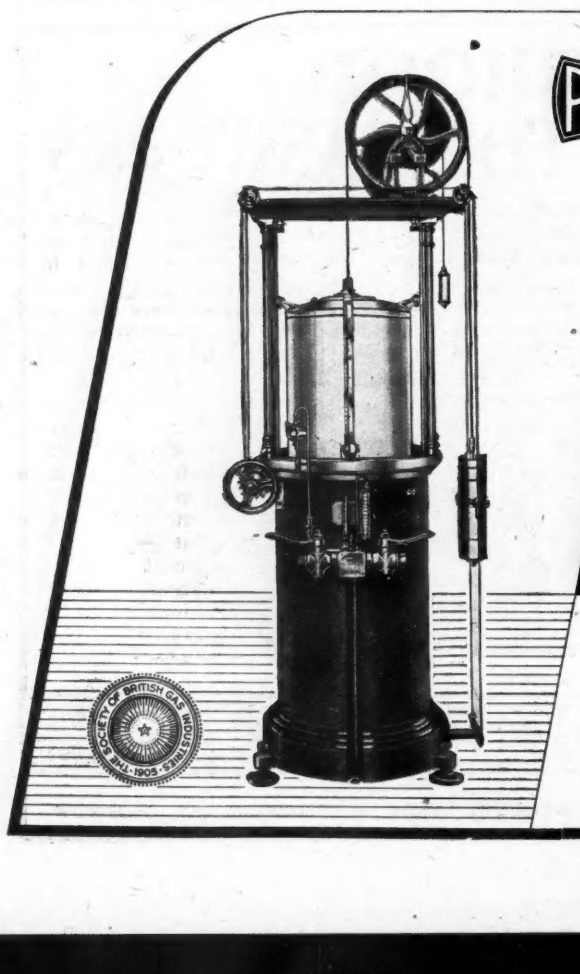

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